

科目：微積分【政經系二年級】

1. (20分) Find the limits of the following functions:

(10分) (a) $\lim_{x \rightarrow 0} \left(\frac{1}{x\sqrt{1+x}} - \frac{1}{x} \right)$

(10分) (b) $\lim_{x \rightarrow 0} \left(\frac{x}{x^2 + |x|} \right)$

2. (20分) Differentiate each function:

(10分) (a) $f(x) = \frac{e^{2x}}{x^2}$

(10分) (b) $y = \log_2(2x+3)$

3. (10分) In the model of perfect competition, all firms are price-takers since they treat price as a market-determined constant. Assume that $P = 60$ and the total cost function for a firm facing perfect competition is

$$TC(Q) = Q^3 - 63Q^2 + 300Q + 200$$

Determine the firm's profit function and the level of output at which it should produce in order to maximize profits. Confirm that this quantity represents maximum profits for the firm by using the second-order condition.

4. (10分) Find the local extreme values for the following function. The second-derivative test must be performed.

$$f(x, y) = -8\ln x + 3\ln y + x^2 + y + 20$$

5. (20分) Use the Lagrangian multiplier method to determine the optimal values for the following constrained optimization problem's choice variables. Use the sufficient condition to determine if they represent local maxima or local minima.

$$y = 3x^{0.6}y^{0.4} \text{ subject to } 2x + y = 10$$

6. (10分) Find the solution to the following differential equation:

$$\dot{x}(t) = \frac{1}{2}x(t) - 3, x(0) = 8$$

7. (10分) Integrate each function.

(5分) (a) $\int \frac{3}{x^2} dx$

(5分) (b) $\int 4e^{2x} dx$

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I. 申論題 (70% 每題 35 分)

1. 現代國家的體制主要可以區分為「單一型體制」、「聯邦體制」與「邦聯體制」等三種類型。請問這三種體制的意涵為何？其又有何不同之處？請舉實例比較與說明。
2. 試說明我國「單一選區兩票制」的改革原因與學理依據，並請由「選舉制度」設計之角度加以分析。

II. 名詞解釋 (30% 每題 6 分)

1. Parliamentary/Cabinet Government
2. Bicameralism
3. Positive Rights
4. The Leviathan State
5. Capitalism

科目：經濟學【政經系二年級】

Multiple Choice

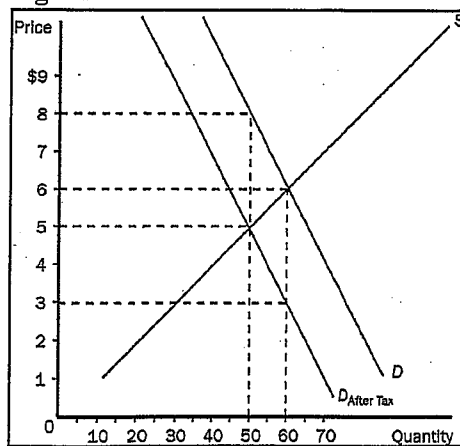
Identify the letter of the choice that best completes the statement or answers the question.

- _____ 1. Mallory decides to spend 3 hours working overtime rather than watching a video with her friends. She earns \$8 an hour. Her opportunity cost of working is
- the \$24 she earns working.
 - the \$24 minus the enjoyment she would have received from watching the video.
 - the enjoyment she would have received had she watched the video.
 - nothing, since she would have received less than \$24 of enjoyment from the video.
- _____ 2. Suppose that the average income of a Kenyan is higher than the average income of a South African. You might conclude that
- South African firms are faced with stricter government regulations than Kenyan firms.
 - total income is divided among fewer workers in Kenya since it has a smaller labor force than South Africa.
 - Kenya's climate allows for longer growing seasons and therefore Kenya can produce large quantities of grain.
 - productivity in Kenya is higher than in South Africa.
- _____ 3. Suppose there are two countries, Freedonia and Sylvania, which have identical amounts of resources, identical technologies, and identical populations. Both produce two types of goods, consumer goods and capital goods, and they both always operate on their production possibilities frontiers. The only difference is that this year Freedonia chooses to produce relatively more consumer goods than Sylvania. As a result,
- Freedonia will have a higher living standard this year but will grow slower than Sylvania.
 - Freedonia will have a higher living standard this year and will grow faster than Sylvania.
 - Sylvania will have a higher living standard this year but will grow slower than Freedonia.
 - Sylvania will have a higher living standard this year and will grow faster than Freedonia.
- _____ 4. Suppose that a worker in Agland can produce either 10 units of organic grain or 2 units of incense per year, and a worker in Zenland can produce either 5 units of organic grain or 15 units of incense per year. There are 20 workers in Agland and 10 workers in Zenland. Currently the two countries do not trade. Agland produces and consumes 100 units of grain and 20 units of incense per year. Zenland produces and consumes 50 units of grain and no incense per year. The combined output of the two countries is therefore 150 units of grain and 20 units of incense per year. If the two countries decided to trade, and completely specialized in producing the good for which each has a comparative advantage, the combined yearly output of the two countries would be
- 50 units of grain and 40 units of incense.
 - 200 units of grain and 150 units of incense.
 - 150 units of grain and 20 units of incense.
 - 200 units of grain and 300 units of incense.
- _____ 5. Total output in an economy increases when each person specializes because
- there is much less competition for the same resources.
 - each person spends more time producing that product for which they have a comparative advantage.
 - a wider variety of products can be produced with specialization.
 - more people will be producing products than before.
- _____ 6. What will happen to the equilibrium price of new textbooks if more students attend college, paper becomes cheaper, textbook authors accept lower royalties and fewer used textbooks are sold?
- Price will rise.
 - Price will fall.
 - Price will stay exactly the same.
 - The price change will be ambiguous.

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7. Which of the following would be most likely to increase the price of a new house?
- Higher wages for carpenters, higher wood prices, increases in consumer incomes, higher apartment rents, increases in population and expectations of higher house prices in the future.
 - Lower wages for carpenters, lower wood prices, increases in consumer incomes, higher apartment rents, increases in population and expectations of higher house prices in the future.
 - Lower wages for carpenters, higher wood prices, decreases in consumer incomes, higher apartment rents, decreases in population and expectations of higher house prices in the future.
 - Lower wages for carpenters, lower wood prices, decreases in consumer incomes, lower apartment rents, decreases in population and expectations of lower house prices in the future.
8. Some firms experience elastic supply curves at low levels of quantity supplied and more inelastic supply curves at higher levels of quantity supplied because
- at low levels of quantity supplied, firms have idle capacity.
 - at high levels of quantity supplied, firms incur higher production costs.
 - at low levels of quantity supplied, per unit production costs are less than at high levels of quantity supplied.
 - Both a and b are correct.
 - Both a and c are correct.

Figure 1

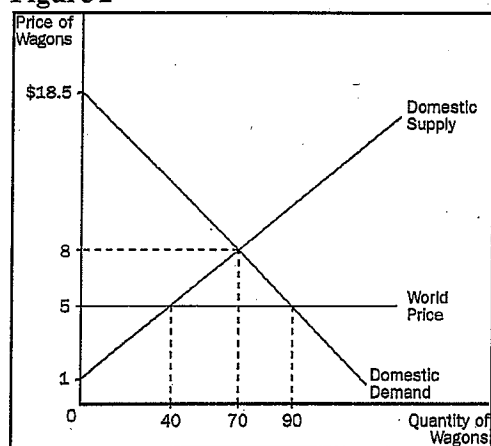


9. Refer to Figure 1. The price buyers will pay after the tax is imposed is
- \$8.00.
 - \$6.00.
 - \$5.00.
 - \$3.00.
10. Suppose that the equilibrium price in the market for widgets is \$5. If a law reduced the maximum legal price for widgets to \$4,
- consumer surplus would necessarily increase even if the lower price resulted in a shortage of widgets.
 - consumer surplus would necessarily decrease because the lower price would create a shortage of widgets.
 - consumer surplus might increase or decrease.
 - consumer surplus would be unaffected.

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11. A technological advance in the production of computers will
- increase consumer surplus in the market for computers and decrease producer surplus in the market for computer software.
 - increase consumer surplus in the market for computers and increase producer surplus in the market for computer software.
 - decrease consumer surplus in the market for computers but increase producer surplus in the market for computer software.
 - decrease consumer surplus in the market for computers and decrease producer surplus in the market for computer software.
12. When a tax is imposed on a good we know that the losses to buyers and sellers
- are equal to the revenue raised by the government.
 - are less than the revenue raised by the government.
 - exceed the revenue raised by the government.
 - cannot be compared to the tax revenue raised by the government since the amount of the tax will vary from good to good.
13. As more people become self-employed and so can determine how many hours they work per week, we would expect that the deadweight loss from the Social Security Tax would
- increase and the revenue generated from it would rise.
 - decrease and the revenue generated from it would rise.
 - increase and the revenue generated from it would fall.
 - decrease and the revenue generated from it would fall.

Figure 2



14. Refer to Figure 2. Without trade, total surplus would be
- \$122.50.
 - \$245.
 - \$367.50.
 - \$612.50.
15. When dealing with externalities, government
- can correct the market failure only in the case of positive externalities.
 - can correct the market failure only in the case of negative externalities.
 - can correct the market failure in both the positive and negative externalities by inducing market participants to internalize the externality.
 - cannot correct for externalities due to consumer rights laws.

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16. Two firms, A and B, each currently dump 50 tons of chemicals into the local river. The government has decided to reduce the pollution and from now on will require a pollution permit for each ton of pollution dumped into the river. It costs Firm A \$100 for each ton of pollution that it eliminates before it reaches the river and it costs Firm B \$50 for each ton of pollution that it eliminates before it reaches the river. The government gives each firm 20 pollution permits. Government officials are not sure whether to allow the firms to buy or sell the pollution permits to each other. What is the total cost of reducing pollution if firms *are not* allowed to buy and sell pollution permits from each other? What is the total cost of reducing pollution if the firms *are* allowed to buy and sell permits from each other?
- \$3,000; \$1,500
 - \$4,500; \$3,000
 - \$4,000; \$4,000
 - \$3,500; \$2,500
17. The overuse of a common resource relative to its economically efficient use is called
- monopolistic competition.
 - tragedy of the commons.
 - common resource abuse.
 - communism.
18. Which of the following statements is most correct?
- A general sales tax on food is regressive when low-income taxpayers spend a larger proportion of their income on food than high-income taxpayers.
 - A general sales tax on food is regressive when middle income taxpayers spend a smaller proportion of their income on food than high-income taxpayers.
 - A general sales tax on food is regressive when high-income taxpayers spend a larger proportion of their income on food than middle income taxpayers.
 - A general sales tax on food is regressive when high-income taxpayers spend a larger proportion of their income on food than low-income taxpayers.
19. Consider the following information about baseball production at Bob's Baseball Factory:

Worker	Marginal Product
1	3
2	5
3	8
4	10
5	7
6	4
7	2

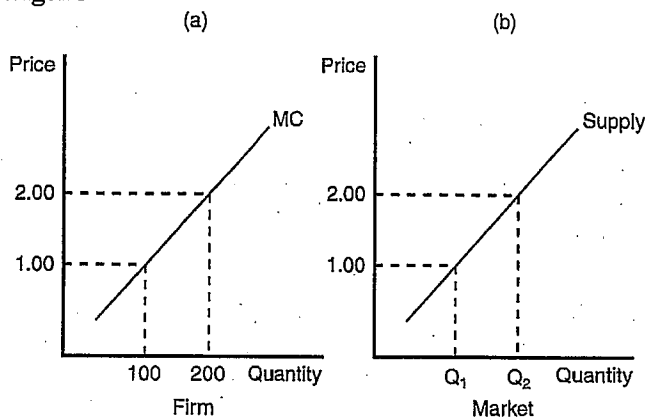
Bob pays all his workers the same wage and labor is his only variable cost. From this information we can conclude that Bob's average variable cost decreases

- as output rises from 0 to 10, but rises after that.
- as output rises from 0 to 26, but rises after that.
- as output rises from 0 to 33, but increases after that.
- continually as output rises.

In the figure below, panel (a) depicts the linear marginal cost of a firm in a competitive market and panel (b) depicts the linear market supply curve for a market with a fixed number of identical firms. Use the figure to answer the following questions.

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Figure 3



20. Refer to Figure 3. If at a market price of \$1.75, 52,500 units of output are supplied to this market, how many identical firms are participating in this market?
- 75
 - 100
 - 250
 - 300
21. A reduction in a monopolist's fixed costs would
- decrease the profit-maximizing price and increase the profit-maximizing quantity produced.
 - increase the profit-maximizing price and decrease the profit-maximizing quantity produced.
 - not effect the profit-maximizing price or quantity.
 - possibly increase, decrease or not effect profit-maximizing price and quantity, depending on the elasticity of demand.
22. Anna, Bill and Charles are competitors in a local market, and each is trying to decide if it is worthwhile to advertise. If all of them advertise, each will earn a profit of \$5,000. If none of them advertise, each will earn a profit of \$8,000. If only one of them advertises, the one who advertises will earn a profit of \$10,000 and the other two will each earn \$2,000. If two of them advertise, those two will each earn a profit of \$6,000 and the other one will earn \$1,000. If all three follow their dominant strategy, Anna will
- advertise and earn \$5000.
 - advertise and earn \$6,000.
 - advertise and earn \$10,000.
 - not advertise and earn \$8,000.
23. A monopolistically competitive firm faces the following demand curve for its product:

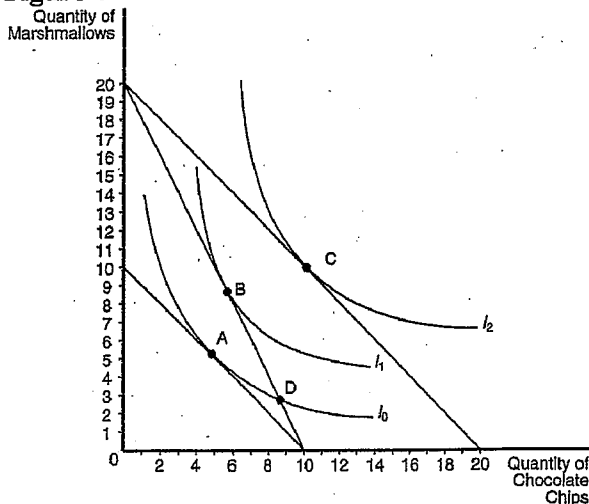
Price (\$)	10	9	8	7	6	5	4	3	2	1
Quantity	2	4	6	8	10	12	14	16	18	20

- The firm has total fixed costs of \$20 and a constant marginal cost of \$5 per unit. The firm will
- produce two units; firms will exit the market in the long run.
 - produce four units; firms will exit the market in the long run.
 - produce six units; firms will exit the market in the long run.
 - produce eight units; firms will enter the market in the long run.

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24. As a result of a severe flooding, a farmer loses one half of his productive farmland. If the property of diminishing returns applies to all factors of production, he should expect to see
- an increase in the marginal productivity of his remaining land and an increase in the marginal productivity of his labor.
 - an increase in the marginal productivity of his remaining land and a decrease in the marginal productivity of his labor.
 - a decrease in the marginal productivity of his remaining land and an increase in the marginal productivity of his labor.
 - a decrease in the marginal productivity of his remaining land and a decrease in the marginal productivity of his labor.
25. Nemedia and Aquilonia have just started to trade with each other. Nemedia exports goods produced with skilled labor and imports goods made with unskilled labor from Aquilonia. Over time we would expect that the wages of skilled labor in Nemedia will
- rise and the wages of unskilled labor in Nemedia will fall.
 - fall and the wages of unskilled labor in Nemedia will rise.
 - rise and the wages of unskilled labor in Nemedia will rise.
 - fall and the wages of unskilled labor in Nemedia will fall.
26. Assume that the government proposes a negative income tax that calculates taxes owed by the formula, Taxes Owed = $(1/3 \times \text{Income}) - 10,000$. If a family doesn't earn any income, how does the negative income tax affect them?
- They will receive an income subsidy of \$1,000.
 - They will receive an income subsidy of \$3,000.
 - They will receive an income subsidy of \$10,000.
 - They will not be affected at all, since the negative income tax requires a family to earn income.

Figure 4



27. Refer to Figure 4. If point B is the consumer's optimum and her income is \$80, what is the price of Marshmallows?
- \$4
 - \$5
 - \$8
 - None of the above are correct.

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28. Steph buys a designer dress produced by an American-owned fashion shop in France. As a result, U.S. consumption increases, U.S. net exports
- decrease, U.S. GDP is unaffected, but U.S. GNP increases.
 - decrease, U.S. GDP increases, but U.S. GNP is unaffected.
 - decrease, U.S. GNP increases, but French GDP is unaffected.
 - are unaffected, U.S. GDP is unaffected, but French GDP increases.
29. An inflation rate calculated using the CPI shows the rate of change of
- all prices.
 - the prices of all final goods and services.
 - the prices of all consumer goods.
 - the prices of some consumer goods.
30. In the country of Hyrkania, the CPI in 2000 was 120 and the CPI in 2001 was 132. Jake, a resident of Hyrkania, borrowed money in 2000 and repaid the loan in 2001. If the nominal interest rate on the loan was 12 percent, then the real interest rate was
- 12 percent.
 - 10 percent.
 - 2 percent.
 - impossible to determine without knowing the base year for the CPI.
31. If an economy with constant returns to scale were to double its physical capital stock, its available natural resources, and its human capital, but leave the size of the labor force the same,
- its output would stay the same and so would its productivity.
 - its output and productivity would increase, but less than double.
 - its output and productivity would increase by more than double.
 - None of the above are correct.
32. The president of a poor country has announced that he will implement the following measures which he claims are designed to increase growth: 1. Reduce corruption in the legal system; 2. Reduce reliance on market forces because they allocate goods and services in an unfair manner; 3. Restrict investment in domestic industries by foreigners because they take some of the profits out of the country; 4. Encourage trade with neighboring countries; and 5. Increase the fraction of GDP devoted to consumption. How many of these measures will have a positive effect on growth?
- 1
 - 2
 - 3
 - 4
33. Suppose that the government were to replace the income tax with a consumption tax. This would make the interest rate
- and investment increase.
 - and investment decrease.
 - increase and investment decrease.
 - decrease and investment increase.
34. A change in the tax laws which increases the supply of loanable funds will have a bigger effect on investment when
- the demand for loanable funds is more elastic and the supply of loanable funds is more inelastic.
 - the demand for loanable funds is more inelastic and the supply of loanable funds is more elastic.
 - both the demand for and supply of loanable funds are more elastic.
 - both the demand for and supply of loanable funds are more inelastic.

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35. Amy says that the future value of \$250 saved for one year at 6 percent is less than the future value of \$250 saved for two years at 3 percent. Brad says that the present value of a \$250 payment in one year when the interest rate is 6 percent is less than the value of a \$250 payment in two years when the interest rate is 3 percent.
- Amy and Brad are both correct.
 - Amy and Brad are both incorrect.
 - Only Amy is correct.
 - Only Brad is correct.
36. Your rich uncle Earl tells you that he will give you \$500 in two years. You could borrow the present value of this \$500 and when your uncle sends you the gift have just enough to pay off the loan. About how much can you borrow if the interest rate is 11 percent?
- \$396.05
 - \$402.13
 - \$405.81
 - \$409.84
37. Most economists agree that eliminating unemployment insurance would
- increase unemployment because people would quit jobs they thought were not secure.
 - increase unemployment because if the government didn't provide unemployment insurance, private firms would offer superior insurance.
 - reduce unemployment and so improve economic well-being.
 - reduce unemployment, but they disagree about whether economic well-being would be enhanced by such a change.
38. In 2000 in Japan, based on concepts similar to those used to compute U.S. employment statistics, the unemployment rate was about 4.8 percent, the labor force participation rate was about 62 percent, and the adult population was about 108 million. How many people were employed and how many were unemployed?
- about 63.8 million and 3.2 million.
 - about 63.8 million and 5.2 million.
 - about 67 million and 3.2 million.
 - about 67 million and 5.2 million.
39. If the reserve ratio is 20 percent, and banks do not hold excess reserves, when the Fed sells \$40 million of bonds to the public, bank reserves
- increase by \$40 million and the money supply eventually increases by \$200 million.
 - increase by \$40 million and the money supply eventually increases by \$800 million.
 - decrease by \$40 million and the money supply eventually decreases by \$200 million.
 - decrease by \$40 million and the money supply eventually decreases by \$800 million.
40. The Fed can increase the price level by conducting open market
- sales and raising the discount rate.
 - sales and lowering the discount rate.
 - purchases and raising the discount rate.
 - purchases and lowering the discount rate.
41. The banking system has \$10 million in reserves, the reserve requirement is 20 percent, and there are no excess reserves. The public holds \$10 million in cash. Then bankers decide that it is prudent to hold some excess reserves, and so begin to hold 25 percent of deposits in the form of reserves. Other things the same, this action will cause the money supply to
- change forms, but not size.
 - fall by \$10 million.
 - fall by \$5 million.
 - fall by \$.5 million.

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42. Which of the following is not implied by the quantity equation?
- If velocity is stable, an increase in the money supply creates a proportional increase in nominal output.
 - If velocity is stable and money is neutral, an increase in the money supply creates a proportional increase in the price level.
 - With constant money supply and output, an increase in velocity creates an increase in the price level.
 - With constant money supply and velocity, an increase in output creates a proportional increase in the price level.
43. Suppose the real exchange rate is 1/2 gallon of Canadian gasoline per gallon of U.S. gasoline, a gallon of U.S. gasoline costs \$1.50 U.S., and a gallon of Canadian gas costs \$3.90 Canadian. What is the nominal exchange rate?
- .385 Canadian dollars per U.S. dollar
 - .65 Canadian dollars per U.S. dollar
 - 1.30 Canadian dollars per U.S. dollar
 - None of the above is correct.

Use the (hypothetical) information in the following table to answer the following questions.

Table 1

Country	Currency	Currency per U.S. Dollar	U.S. Price Index	Country Price Index
Brazil	Real	4.00	200	800
Japan	Yen	125.00	200	50,000
Mexico	Peso	10.00	200	2,000
Sweden	Krona	9.00	200	2,000
Thailand	Baht	45.00	200	8,000

44. Refer to Table 1. Assume that there are no transportation costs or trade restrictions. Arbitrageurs could make money trading with which countries?
- Brazil and Mexico
 - Japan, Sweden, and Thailand
 - Japan and Sweden
 - Thailand
45. Which of the following contains a list only of things that decrease when the budget deficit of the U.S. increases?
- U.S. net exports, U.S. domestic investment, U.S. net capital outflow
 - U.S. supply of loanable funds, U.S. interest rates, U.S. domestic investment
 - U.S. imports, U.S. interest rates, the real exchange rate of the dollar
 - None of the above is correct.
46. An increase in the expected price level shifts short-run aggregate supply to the
- right, and an increase in the actual price level shifts short-run aggregate supply to the right.
 - right, and an increase in the actual price level does not shift short-run aggregate supply.
 - left, and an increase in the actual price level shifts short-run aggregate supply to the left.
 - left, and an increase in the actual price level does not shift short-run aggregate supply.

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- _____ 47. Suppose the economy is in long-run equilibrium. If there is a sharp increase in the minimum wage as well as an increase in pessimism about future business conditions, then we would expect that in the short-run,
- real GDP will rise and the price level might rise, fall, or stay the same.
 - real GDP will fall and the price level might rise, fall, or stay the same.
 - the price level will rise, and real GDP might rise, fall, or stay the same.
 - the price level will fall, and real GDP might rise, fall, or stay the same.
- _____ 48. The economy is in long-run equilibrium. Congress passes regulations that make it more costly to conduct business, so the long-run aggregate supply curve shifts \$60 billion to the left. At the same time, government purchases increase by \$60 billion. If the *MPC* equals 0.8 and the crowding-out effect is \$60 billion, we would expect that in the long run,
- both real GDP and the price level would be higher.
 - both real GDP and the price level would be lower.
 - real GDP would be lower but the price level would be higher.
 - real GDP would be lower but the price level would be the same.
- _____ 49. Suppose a war disrupts the supply of oil to the country. We would expect the
- short-run aggregate supply curve, short-run Phillips curve, and long-run Phillips curve to shift left.
 - short-run aggregate supply curve, short-run Phillips curve, and long-run Phillips curve to shift right.
 - short-run aggregate supply curve to shift left, and the short-run Phillips curve and long-run Phillips curve to shift right.
 - short-run aggregate supply curve to shift left, the short-run Phillips curve to shift right, and the long-run Phillips curve to be unaffected.
- _____ 50. Suppose that the central bank is required to follow a monetary policy rule to stabilize prices. If the economy starts at long-run equilibrium and then aggregate supply shifts right the central bank should
- increase the money supply, which causes output to move closer to its long-run equilibrium.
 - increase the money supply, which causes output to move farther from long-run equilibrium.
 - decrease the money supply, which causes output to move closer to its long-run equilibrium.
 - decrease the money supply, which causes output to move farther from long-run equilibrium.